

# 416E

## Backhoe Loader



### Engine

Engine Model (Standard)	3054C DINA	
Gross Power – SAE J1995	58 kW	78 hp
Net Power – SAE J1349	55 kW	74 hp
Engine Model (Optional)	3054C DIT	
Gross Power – SAE J1995	69 kW	93 hp
Net Power – SAE J1349	66 kW	89 hp

### Weights

Operating Weight – Nominal	6792 kg	14,960 lb
Operating Weight – Maximum	10 200 kg	22,466 lb

### Backhoe

Dig Depth – Standard	4360 mm	14 ft 4 in
Dig Depth – Extended	5456 mm	17 ft 11 in

# 416E Backhoe Loader

*Caterpillar® Backhoe Loaders set the industry standard for operator comfort, performance, versatility and jobsite efficiency.*

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## Operator Station

- ✓ The all-new operator station maximizes operator comfort and productivity. The spacious cab features excellent visibility and easy to use traditional mechanical backhoe controls. **pg. 4**

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## Backhoe and Loader Features

- ✓ New extendible stick is designed for improved performance and digging forces. New wear pad design provides increased life and improved serviceability. **pg. 6**

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## Hydraulics

- ✓ Caterpillar's state-of-the-art closed-center hydraulic system, variable displacement piston pump and load-sensing hydraulics improve implement response and speed while still providing high forces at any engine speed. New flow-sharing hydraulic valves improve multi-function performance. **pg. 7**

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## AccuGrade® Reference Systems for Backhoe Loaders

- ✓ Caterpillar is revolutionizing excavation with new technology solutions. The AccuGrade Reference Systems for Backhoe Loaders are entry-level grade and depth check systems that provide accuracy, productivity, lower operating costs and enhanced profitability. **pg. 12**

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## Additional Features

- ✓ Features such as Product Link, combined function hydraulics, stackable counterweights, new stabilizer pads and new work lights increase productivity and versatility. **pg. 13**

*With a more comfortable operator station, new extendible stick design and increased performance, the 416E lets you get more done with less effort.*



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### Power Train

- ✓ The Cat® 3054C DINA and optional 3054C DIT engines meet all U.S. EPA Tier 2/EU Stage II emissions requirements. The efficient fuel system delivers reliable engine lug performance. The transmission and new Cat axles provide increased roading speed. **pg. 8**

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### Ride Control

Optional Caterpillar® Ride Control provides a comfortable ride at all speeds, both on the jobsite and on the highway. System is designed to provide an improved ride whether the bucket is full or empty. **pg. 9**

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### Work Tools

A new hydraulic thumb is part of the wide range of Cat Work Tools that are available to meet the needs of your jobsite applications. All machines are equipped with thumb mounting brackets. **pg. 10**

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### Serviceability and Customer Support

Easier maintenance results in greater machine uptime and lower owning and operating costs. New tilt-up hood provides easier access to the engine compartment. Your Cat dealer offers a wide range of services that can be set up under a Customer Support Agreement. **pg. 14**



✓ *New Feature*

## Operator Station

*The all-new operator station provides maximum comfort and ease of operation.*



*Utility Plus Cab*

**Operator Comfort.** The all-new operator station has been designed to maximize operator comfort and productivity. The spacious work environment provides more legroom. Integrated storage areas and cupholders are designed for operator convenience.

**New Styling.** The new ergonomic, automotive styling of the operator station enhances the operator environment. The narrow front dash provides excellent visibility to the front bucket.

**ROPS Canopy.** Features of the ROPS canopy include:

- Air suspension vinyl seat
- Fixed steering column
- Floor mat
- Four working lights
- Vandalism guard
- Internal and external power receptacle
- Drink holders
- Phone clip

**ROPS Canopy Plus.** Includes all of the features of the ROPS canopy with the addition of the following:

- Front windshield
- Wiper/washer system
- Left side storage space with a lockable compartment
- Eight working lights
- Tilt steering column

**Utility Cab.** The utility cab features include:

- Front and rear windshield
- Left side door
- Right side opening window
- Wiper/washer system
- Air suspension fabric seat
- Four working lights
- Floor mat
- Fixed steering column
- Internal and external power receptacle
- Drink holders
- Phone clip

**Utility Plus Cab.** Includes all of the features of the utility cab with the addition of the following:

- Two doors
- Eight working lights
- Left side storage space with a lockable compartment
- Tilt steering column
- Radio-ready

**Utility Plus Cab with Air Conditioning.** Includes all of the features of the utility plus cab with the addition of air conditioning.

**Air Suspension Seat.** The standard air suspension seat, available in vinyl or fabric, utilizes an air adjustment mechanism for a greater operating range and more comfortable ride. A switch on the side control allows the seat to be tailored to support differing body weights. Adjustable seat height accommodates all operators.

**HVAC System.** The improved air conditioning system features enhanced air distribution and performance for a more comfortable work environment. Large capacity fresh air filter is easily serviced from ground level with no tools required. Nearly 20% increase in air flow combined with improved louver locations provide superior operator comfort.

**Machine Controls.** Switches are located at operator level. The boom lock and stabilizer controls, which provide low effort and fine modulation, are within easy reach. White-faced gauges are easy to read.

**Backhoe Controls.** Two mechanical control patterns are available: two-lever excavator and two-lever backhoe.

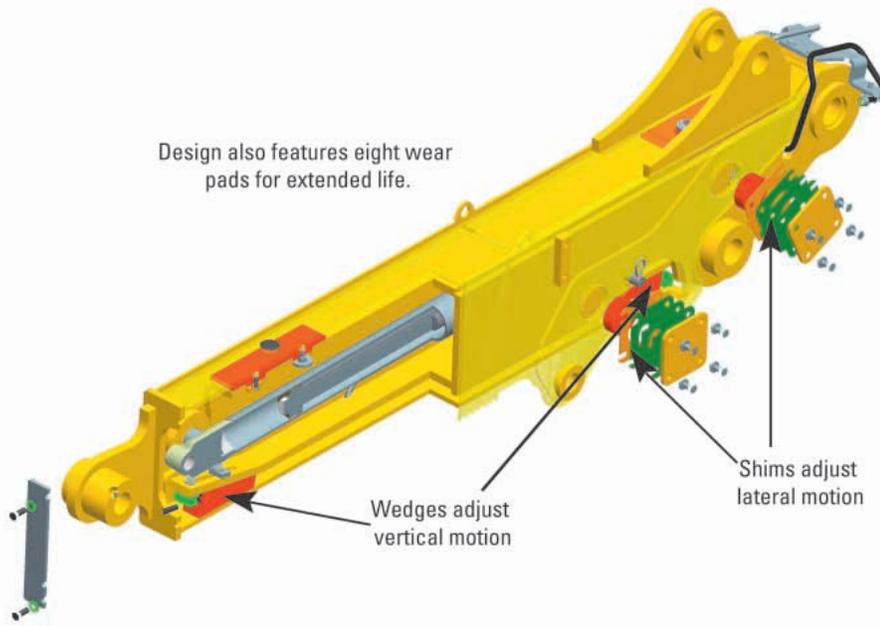
**Viewing Area.** The narrow boom enhances the rear viewing area. The sloping front hood and divergent lift arms allow the operator to see more of the forward work area and loader attachments.



**Storage Compartment.** New lockable, left side storage is standard on the following configurations: ROPS canopy plus, utility plus cab and utility plus cab with air-conditioning.

## Backhoe and Loader Features

*New extendible stick is designed for better performance, higher force and improved serviceability.*



### Extendible Stick Design

**New Backhoe Design.** The completely new E-Series backhoe delivers industry-leading digging forces. Its rugged design provides durability in the toughest applications. Serrated edges on the stick provide improved material clamping for clearing and demolition applications.

**New Extendible Stick.** The optional extendible stick (E-stick) increases reach and dig depth by approximately 1.2 meters (4 feet). The new design delivers increased life and easy in-field adjustment.

### High Rotation Backhoe Linkage.

Single pin bucket linkage contributes to best-in-class rotation of 205 degrees for all applications, eliminating the need to change pin positions when moving from loading trucks to vertical wall trenching.

**Backhoe Boom.** The excavator-style boom features box section fabrication with thicker plates for optimum performance and durability. The curved design provides additional clearance over obstacles while digging a trench or truck loading. The narrow boom enhances the viewing area to the bucket and trench throughout the entire operating range.

**Backhoe Swing Casting.** New swing casting is designed to handle the high performance of the E-Series backhoe. It features replaceable bushings for durability and serviceability.



**Thumb Mounting.** Thumb mounting provisions are standard on every Cat Backhoe Loader for added machine versatility. Hydraulic thumbs are available factory-installed.

**Single Tilt Loader Linkage.** The standard single tilt loader linkage features strong lift and breakout forces for solid performance in backfilling and truck loading applications. The 416E is equipped with either a general purpose or multi-purpose pin-on bucket to meet your specific needs.

# Hydraulics

*Caterpillar sets the standard in power and precision with load-sensing hydraulics.*

## **Load-Sensing Hydraulic System.**

The variable displacement piston pump and flow-sharing hydraulic valves sense work demand and adjust flow and pressure for increased productivity. Load-sensing hydraulics deliver:

- Cooler hydraulic system
- Better fuel efficiency
- Quieter operation
- Reduced wear on components

**Hydraulic Pump.** The variable displacement piston pump improves implement response and speed while still providing high forces at any engine speed.

## **Flow-Sharing Hydraulic Valves.**

New flow-sharing hydraulic valves automatically distribute flow to optimize multi-function implement performance. Closed-center implement valves signal hydraulic system requirements to a control valve located on the pump.

**Clamps and Bushings.** Metal clamps with rubber bushings are used at hose attachment points to eliminate metal-to-metal contact and increase wear life.

## **Cat XT-3 ES ToughGuard™ Hoses.**

Improved bend radius and abrasion resistance provide reliable long life in the toughest conditions. Made of four overlapping, insulated wire spiral wraps bonded together for durability, Cat XT-3 ES (Enhanced Spiral) ToughGuard hoses exceed SAE certification standards. The hose routing protects them from work damage, and hose failure is substantially reduced. Cat XT-3 ES ToughGuard hoses combined with Cat couplings and O-ring face seal fittings provide a leak-free system. All backhoe hydraulic circuits utilize the new ToughGuard hose with extended wear characteristics.



## Power Train

*The Cat 3054C engine is built for performance, power, reliability and fuel efficiency.*



**3054C Diesel Engine.** The 3054C DINA (Direct Injection Naturally Aspirated) 55 kW (74 hp) engine meets all U.S. EPA Tier 2/EU State II emissions requirements. It delivers high horsepower, increased torque rise, traditional Cat durability and reliable power with low emissions.

The Cat 3054C DIT (Direct Injection Turbocharged) 66 kW (89 hp) engine is optional.

**Enhanced Roading Speed.** Maximum roading speed has been increased to 40 kph (25 mph) for faster travel between jobsites.

**Direct Injection Fuel System.** Individual unit fuel injectors deliver efficient and accurate fuel metering and reduced emissions. The water separator service indicator ensures the operator is alerted when service is necessary.

**Air Cleaner.** A dry-type axial seal air cleaner with automatic, integrated dust ejection system provides more efficient pre-separation. The two-stage air filter incorporates both air cleaner and pre-cleaner functions into a single unit mounted under the hood.

**New Cat Rear Axles.** New heavy-duty rear axles are designed specifically for demanding backhoe loader applications. Features include outboard planetary gear sets for serviceability and brake design improvements for longer life.

**Transmission.** The Caterpillar power shuttle transmission provides four speeds forward and reverse. Full synchromesh gears and hydraulically shifted forward and reverse shuttle clutches allow direction and travel speed to be changed on-the-go. A neutral start provision prevents starting while the shuttle is engaged.

**Transmission Neutralizer.** Standard on the 416E, the hand-operated power disconnect provides easy, on-the-go shifting and full engine rpm for faster cycle times. Neutralizer is located on the gear shift lever for operator convenience.

**Smoother Shifts.** New modulated transmission control valves provide smoother speed and directional shifts.

### **Four Wheel Drive (4WD) Option.**

Heavy-duty front drive axle can be engaged at any time by activating the switch on the front console. The switch can be activated while the machine is stopped or moving, with or without load. 4WD features outboard planetary gear final drives and improves mobility and loader performance in poor traction conditions.

**Brake Mode Selector.** The brake mode selector switch has three positions: two wheel drive, two wheel drive with all wheel braking and four wheel drive. Center position provides two wheel drive for better tire life while roading and engages the front axle when brakes are applied for improved braking performance.

## Ride Control

*Optional Caterpillar Ride Control delivers even greater operator comfort.*

**Ride Control System.** The optional Ride Control System incorporates a nitrogen accumulator in the loader lift circuit that smooths the ride in all conditions, including load and carry, highway roading, or simply moving around the jobsite.

**Improved Productivity.** The Ride Control option improves material retention in the loader bucket for increased productivity and a cleaner jobsite.

**Controllability.** Ride Control reduces machine loping, providing a smooth and stable ride for increased operator comfort and reduced operator fatigue.

**Convenient Operation.** The system is easily engaged by a switch on the front console.



## Work Tools

Choose from a wide variety of tools designed specifically for the backhoe loader.



**Work Tools.** Caterpillar Work Tools for backhoe loaders extend the versatility of the machine. Built for performance and durability, these tools deliver high productivity, long service and excellent value.

### Backhoe Work Tools.

- Standard Duty Bucket
- Heavy Duty Bucket
- Heavy Duty Rock Bucket
- High Capacity Bucket
- Soil Excavation Bucket
- Coral Bucket
- Ditch Cleaning Bucket
- Cold Planer
- Hydraulic Hammer
- Vibratory Plate Compactor
- Ripper
- Thumb
- Auger

### Loader Work Tools.

- General Purpose Bucket
- Multi Purpose Bucket
- Side Dump Bucket
- Light Material Bucket
- Loader Forks

**Bucket Line.** Caterpillar's expansive bucket line includes rock and coral bucket designs. The side profile has a scalloped edge, similar to an excavator bucket, for exceptional fill factor characteristics and secure clamping ability.

**Standard Duty Bucket.** Used in easy-to-penetrate, low-impact, moderately abrasive materials.

**Heavy Duty Bucket.** Used for a wide variety of soil conditions such as semi-rocky soil and hard bank material.

**High Capacity Bucket.** Same durable construction as the heavy duty bucket for tough materials with longer tip radius to provide increased bucket capacity. Increased draft angle on the tooth adapter provides greater performance.

**Heavy Duty Rock Bucket.** Specifically designed to address harsh, rocky conditions and capable of digging in granite, caliche and rocky soil.

**Coral Bucket.** Features highest breakout and short tip radius for breaking up coral.

**Soil Excavation Bucket.** This high capacity, heavy duty bucket optimizes digging performance over a wide spectrum of ground conditions. With an increased tooth adapter draft angle and new tooth tips, productivity is not only increased, but tooth tips last longer in rocky conditions.



*Soil Excavation Bucket with Coupler*

**Backhoe Quick Couplers.** Quick couplers allow for quick attachment of buckets and other work tools. The E-Series high rotation pin grabber design allows buckets to be changed without removing the bucket pins. Other manufacturers' buckets can be coupled with a pin puller coupler, one for Case and E-Series buckets or one for John Deere and E-Series buckets.

**Tips.** A variety of bucket tips are available from your Cat dealer for optimum performance in any application.



**DRS 230 (Diagonal Retention System).**

DRS 230 with wide adapters provides maximum strength and improved wear characteristics. Heavy-duty bucket teeth are attached with diagonal pins rather than horizontal pins for easy exchange. The adapters are stronger as a result of this improved diagonal pinning and additional wear material on the bucket teeth increases durability.

**Lift Eye.** An integral lifting eye is a standard feature of the bucket linkage.



**Thumb.** Available for both the standard and the extendible stick, thumbs increase the versatility of the backhoe with the ability to grip, grab and sort virtually any material.

# AccuGrade® Reference Systems for Backhoe Loaders

*Advanced technology simplifies excavation, improves accuracy, increases efficiency and lowers production costs.*



**In-Cab Display.** The AccuGrade monitor allows the operator to enter slope and dig depth parameters. The in-cab display with easy to read grade indicator and elevation display delivers all system information to the cab for easy viewing by the operator.

**Weatherproof Design.** All components are ruggedly designed for dependable performance in harsh environments.

**Laser Reference System.** The AccuGrade Laser Reference System works with laser transmitters to accurately grade or excavate to a site plan without the use of grade stakes. The advanced system includes all components of the basic system with the addition of the following:

- Laser receiver
- Electric mast
- Laser mast mount
- Laser wiring harnesses
- Laser transmitter and tripod (sold separately)

**Advantages.** Current trenching and excavating processes are labor intensive, dependent on manpower and instruments. Maintaining consistent grade between grade stakes is challenging, even for experienced operators. The AccuGrade® Reference Systems for Backhoe Loaders reduces labor requirements, aids operators in maintaining a consistent slope across the worksite and reduces material cost.

**Applications.** The AccuGrade system is designed for a wide range of construction trenching applications. Whether excavating around obstacles such as pipes or grading banks and trenches, the AccuGrade system ensures accurate cuts, precise grades and faster cycle times.

**Operation.** The AccuGrade Site Reference System for Backhoe Loaders enables the operator to select machine work tool and excavate to pre-determined coordinates. The intuitive software and controls allow the operator to set target grades. The in-cab display provides bucket position and grade settings to ensure the operator excavates to those parameters. Additional feedback is provided through LED lights and sound. The system consists of the following components:

- Cylinder position sensors
- Swing position sensor
- In-cab display
- Inclinometer (pitch and roll sensor)
- Wiring harnesses



## Additional Features

*Features such as Product Link, combined function hydraulics, stackable counterweights, new stabilizer pads and new work lights increase productivity.*

**New Combined Function Auxiliary Hydraulics Lines.** New backhoe auxiliary lines provide one-way or two-way flow for work tools such as hammers, vibratory compactors, augers and thumbs. Standard hydraulic quick disconnects allow fast tool exchange.

**Product Link.** This established Caterpillar technology uses a Global Positioning System (GPS) to provide machine data to both Cat dealers and end users. Data can be received by either a web based application system or notification by e-mail or pager. Product Link can provide:

- Machine hours
- Location
- Machine events and diagnostics from data link

**Stackable Counterweights.** Stackable counterweights allow easy adjustment of weight distribution without having to completely replace an existing counterweight.

**New Work Lights.** New work lights are adjustable and better aligned for improved lighting of the work area.

**Fuel Tank.** Large capacity tank located on the frame's left side is lockable and includes a replaceable, bolt-on step.

**Tool and Battery Box.** Lockable, hinged door provides easy access to battery box with no hand tools required. Permanent punched hole steel tread plate on top provides stable footing in all weather conditions.



**Flip Over Stabilizer Pads.** Flip over stabilizer pads provide the ability to work in both dirt and street applications. New pads are stronger, feature a positive anti-flip mechanism and provide increased rubber wear life.

**Fabricated Grouser Pads.** Designed for dirt applications, the new fabricated grouser pads provide superior strength and durability.

## Serviceability and Customer Support

*Simplified service and maintenance save you time and money.*



**Tilt-Up Hood.** The tilt-up hood provides easy, convenient access to all engine check points from the left side of the machine. Fill caps are color-coded for quick identification.

**Selection.** Make detailed comparisons of the machines you are considering before you buy. Cat dealers can estimate component life, preventative maintenance and the true cost of lost production. You can also customize the machine that is right for you. Go on-line anytime to review the full range of features and options available using the Build and Quote applications on your dealer's website or [www.cat.com](http://www.cat.com).

**Purchase.** Look at the value E-Series backhoe loaders offer. Consider all the flexible financing options your Cat dealer offers as well as day-to-day operating costs.

**Operation.** Improving operating techniques can boost your profits. Turn to your Cat dealer for the latest training literature and trained staff.

**Maintenance.** Repair option programs guarantee the cost of repairs up front. Diagnostic programs such as S•O•S<sup>SM</sup> and Coolant Sampling and Technical Analysis help you avoid unscheduled repairs.

**Replacement.** Repair, rebuild or replace? Your Cat dealer can help you evaluate the cost involved so you can make the right choice.

**Product Support.** You will find nearly all parts at our dealer parts counter. Cat dealers utilize a worldwide computer network to find in-stock parts to minimize machine downtime. Additionally, Caterpillar offers a line of genuine remanufactured components which can help lower repair costs.

**Easy Financing.** Your Cat dealer can provide a financing package to meet your needs.

**SAFETY.CAT.COM™.**

## Engine

Engine Model (Standard)	3054C DINA	
Gross Power – SAE J1995	58 kW	78 hp
Gross Power – ISO 14396	56 kW	76 hp
Net Power – SAE J1349	55 kW	74 hp
Net Power – ISO 9249	56 kW	75 hp
Net Power – EEC 80/1269	56 kW	75 hp
Engine Model (Optional)	3054C DIT	
Gross Power – SAE J1995	69 kW	93 hp
Gross Power – ISO 14396	68 kW	92 hp
Net Power – SAE J1349	66 kW	89 hp
Net Power – ISO 9249	67 kW	90 hp
Net Power – EEC 80/1269	67 kW	90 hp
Bore	105 mm	4.13 in
Stroke	127 mm	5 in
Displacement	4.4 L	268 in <sup>3</sup>
Net Torque Rise @ 1,400 rpm – Standard	27%	
Net Torque Rise @ 1,400 rpm – Optional	37%	
Net Peak Torque @ 1,400 rpm – Standard – SAE J1349	296 N•m	219 lb ft
Net Peak Torque @ 1,400 rpm – Optional – SAE J1349	386 N•m	285 lb ft

- The net power ratings apply at 2,200 rpm when tested under the specified conditions for the specified standard.
- Net power advertised is the power available at the flywheel when the engine is equipped with fan, air cleaner, muffler and alternator.
- Based on standard air conditions of 25° C (77° F) and 99 kPa (29.32 in) in dry barometer.
- Used 35° API gravity fuel having an LHV of 42,780 kJ/kg (18,390 BTU/lb) when used at 30° C (89° F) (reference a fuel density of 838.9 g/L [7.001 lb/gal]).
- No derating required up to 2286 m (7,500 ft).
- Net torque rise meets SAE J1349.

## Weights

Operating Weight – Nominal	6792 kg	14,960 lb
Operating Weight – Maximum	10 200 kg	22,466 lb
Cab, ROPS/FOPS	220 kg	485 lb
Ride Control	25 kg	55 lb
Four Wheel Drive	155 kg	342 lb
MP Bucket 1.0 m <sup>3</sup> (1.3 yd <sup>3</sup> ) w/Fold-Over Fork	884 kg	1,949 lb
MP Bucket 1.0 m <sup>3</sup> (1.3 yd <sup>3</sup> ) w/o Fold-Over Fork	714 kg	1,574 lb
Extendible Stick (no weights)	314 kg	692 lb
Counterweights (Option 1)	116 kg	255 lb
Counterweights (Option 2)	231 kg	510 lb
Counterweights (Option 3)	488 kg	1,075 lb

- Total gross machine weight not to exceed 10 200 kg (22,466 lb).

## Backhoe

Dig Depth – Standard	4360 mm	14 ft 4 in
E-Stick Retracted	4402 mm	14 ft 5 in
E-Stick Extended	5456 mm	17 ft 11 in
Reach from Swing Pivot – Standard	5618 mm	18 ft 5 in
E-Stick Retracted	5657 mm	18 ft 7 in
E-Stick Extended	6666 mm	21 ft 10 in
Bucket Rotation	205°	
Bucket Dig Force – Standard	51.8 kN	11,655 lb
E-Stick Retracted	51.1 kN	11,491 lb
E-Stick Extended	51.1 kN	11,491 lb
Stick Dig Force – Standard	31.8 kN	7,151 lb
E-Stick Retracted	31.8 kN	7,151 lb
E-Stick Extended	23.4 kN	5,250 lb
Stick Lift @ 2440 mm (8 ft) – Standard	2321 kg	5,106 lb
E-Stick Retracted	2112 kg	4,646 lb
E-Stick Extended	1323 kg	2,916 lb
Loading Height – Standard	3636 mm	11 ft 11 in
E-Stick Retracted	3577 mm	11 ft 9 in
E-Stick Extended	4145 mm	13 ft 7 in
Loading Reach – Standard	1768 mm	5 ft 10 in
E-Stick Retracted	1868 mm	6 ft 2 in
E-Stick Extended	2771 mm	9 ft 1 in

## Loader

Bucket Capacity – General Purpose	0.76 m <sup>3</sup>	1 yd <sup>3</sup>
Bucket Width – General Purpose	2262 mm	7 ft 5 in
Dump Height @ Max Angle	2651 mm	8 ft 8 in
Dump Reach @ Max Angle	772 mm	2 ft 6 in
Dig Depth	106 mm	4 in
Lift Capacity @ Full Height	2547 kg	5,615 lb
Bucket Breakout Force	40.9 kN	9,185 lb

## Hydraulic System

Circuit Type	Load-sensing, closed center	
Pump Capacity (@ 2,200 rpm)	132 L/min	34.8 gal/min
System Pressure	22 700 kPa	3,292 psi
Pump Type	Variable-flow, axial piston	
Steering Type	Front wheel	
Power Steering	Hydrostatic	
2WD Cylinder – Bore	65 mm	2.56 in
Stroke	120 mm	4.72 in
Rod Diameter	36 mm	1.42 in
4WD Cylinder – Bore	65 mm	2.56 in
Stroke	120 mm	4.72 in
Rod Diameter	36 mm	1.42 in
Brake System	Inboard, oil-immersed, multiple disc	

## Power Train

Power-Shuttle, Forward 1st	6 km/h	3.7 mph
Forward 2nd	9.5 km/h	5.9 mph
Forward 3rd	19.8 km/h	12.3 mph
Forward 4th	39.9 km/h	24.8 mph
Power-Shuttle, Reverse 1st	6 km/h	3.7 mph
Reverse 2nd	9.5 km/h	5.9 mph
Reverse 3rd	19.8 km/h	12.3 mph
Reverse 4th	39.9 km/h	24.8 mph

- Conveniently placed, hand operated lever provides instant direction changes between forward and reverse through power hydraulic clutches.
- Torque converter free-wheel clutch allows the converter stator to free-wheel during high speed, low torque conditions such as roading.
- Single-stage, 2.63:1 stall ratio.
- Travel speeds of two wheel drive backhoe loader at full throttle when equipped with 19.5 × 24 rear tires.

## Operating Specifications – Backhoe

Turning Circle: outside, front wheels	8.16 m	26 ft 9 in
Turning Circle: outside, widest loading bucket	10.74 m	35 ft 3 in

- ISO 5010.
- 2WD, 4WD (inner wheel not braked).

## Service Refills

Cooling System, A/C	15.9 L	4.2 gal
Cooling System, High-Ambient	16.7 L	4.4 gal
Fuel Tank	144 L	38 gal
Engine Oil w/Filter	7.6 L	2 gal
Transmission – Torque Converter, 2WD, Power Shuttle	18.5 L	4.9 gal
Transmission – Torque Converter, 4WD, Power Shuttle	18.5 L	4.9 gal
Rear Axle	16.5 L	4.4 gal
Rear Axle, Planetaries	1.7 L	0.45 gal
Front Axle, 4WD	11 L	2.9 gal
Front Axle, Planetaries	0.7 L	0.2 gal
Hydraulic System	79.5 L	21 gal
Hydraulic Tank	37.9 L	10 gal

## Standards

Brakes	SAE J/ISO 3450, ISO 3450 1996
Cab – ROPS	SAE J1040 May 1994/ISO 3741 1994
Cab – Sound	ANSI/SAE J1166 Oct 98 is 82.4 dB (A)
Exterior Sound	SAE J88 JUN86 is 72.3 dB (A)

## Axle Ratings

Front Axle, 2WD, Static	22 964 kg	50,582 lb
Dynamic	9186 kg	20,233 lb
Front Axle, 4WD, Static	22 964 kg	50,582 lb
Dynamic	9186 kg	20,233 lb
Rear Axle, Static	22 964 kg	50,582 lb
Dynamic	9186 kg	20,233 lb

- 4WD and 2WD axles are pendulum mounted and permanently sealed and lubricated, requiring no daily maintenance. Also features double-acting steering cylinder with 52° steering angle for increased maneuverability. Oscillation 10° each direction from centerline.

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## Engine Features

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- Three-ring pistons made of lightweight, silicon/aluminum alloy for strength and maximum thermal conductivity.
- Forged chrome/molybdenum-steel crankshaft with crankshaft with either induction hardened or nitrocarburized journals.
- Front and rear crankshaft oil seals are “lip” type Viton and PTFE designs featuring an integral dust lip.
- Heat resistant, silicone-chrome steel intake and STELLITE-faced exhaust valves provide long life.
- Cylinder block is high strength, cast iron alloy of deep skirt, monobloc design for increased strength and long life.
- Cylinder head is high strength, cast iron alloy construction with extra duty wall and deck thickness. Intake and exhaust ports are precision cast to promote optimum gas flow.
- Direct injection fuel system provides accurate fuel delivery; remote mounted electric lift pump improves serviceability.
- Self-priming electric lift pump for improved cold start capability and easy filter changes.
- Dry-type axial seal air cleaner with integral precleaner, automatic dust ejection system, and filter condition indicator.
- Direct electric, 12-volt starting and charging system with 880 CCA Group 31 maintenance free battery.
- Standard glow plug starting aid system for efficient cold weather starting.
- High contact ratio/gear train, peripheral fixed isolation top cover and open deck block design reduce bare engine noise.
- Higher low end torque for better engine/machine performance.

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## Tires

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Choices listed as combination of front/rear tires:

- 11L-16 (12 ply) F-3 Industrial Special/19.5L-24 (12 ply) R4 ATU
- 335/80R 18 XM37/19.5L-R24 XM37
- 12.5/80-18 NHS (10 ply) 1-3 Super Traction/21L-24 (16 ply) R4 ATU
- 335/80R 18 XM37/19.5L-24 (12 ply) R4 ATU
- 335/80R 18 XM37/19.5L-R24 (152A8) IT 510
- 12.5/80-18 NHS (10 ply) 1-3 Super Traction/19.5L-24 (12 ply) R4 ATU
- 12.5/80-18 (10 ply) 1-3 Super Traction/19.5L-24 R4 (12 ply) IT 525

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## Brakes

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Features:

- Self-adjusting, completely enclosed and sealed.
- Foot operated brake pedals can be interlocked for roading.
- Parking/secondary brakes are independent of the service brake system. Parking brake is mechanically applied through an adjustable hand lever located on the right console.

## Standard Duty Buckets

With weld-on adapters and pin-on teeth.

Width (mm/in)	Rated Capacity (liters/ft <sup>3</sup> )	Weight (kg/lb)	No. of Teeth
305/12	78/2.8	97/213	3
457/18	118/4.2	115/253	4
610/24	175/6.2	132/290	5
762/30	233/8.2	147/323	5
914/36	292/10.3	165/363	6

## High Capacity Buckets

With weld-on adapters and pin-on teeth. Adapters feature more aggressive digging angle.

Width (mm/in)	Rated Capacity (liters/ft <sup>3</sup> )	Weight (kg/lb)	No. of Teeth
457/18	180/6.4	146/321	4
610/24	240/8.5	171/376	5
762/30	320/11.3	195/429	5
914/36	380/13.4	214/471	6

## Soil Excavation Buckets

With weld-on adapters and pin-on soil digging teeth. Adapters feature more aggressive digging angle.

Width (mm/in)	Rated Capacity (liters/ft <sup>3</sup> )	Weight (kg/lb)	No. of Teeth
457/118	181/6.4	153/336	4
610/24	241/8.5	179/395	5
762/30	320/11.3	197/434	5
914/36	380/13.4	223/491	6

## Heavy Duty Buckets

With weld-on adapters and pin-on teeth.

Width (mm/in)	Rated Capacity (liters/ft <sup>3</sup> )	Weight (kg/lb)	No. of Teeth
305/12	78/2.8	105/231	3
406/16	105/3.7	127/279	3
457/18	118/4.2	129/284	4
610/24	175/6.2	151/332	5
762/30	233/8.2	167/367	5
914/36	292/10.3	189/416	6

## Heavy Duty Rock Buckets

With weld-on adapters and pin-on teeth.

Width (mm/in)	Rated Capacity (liters/ft <sup>3</sup> )	Weight (kg/lb)	No. of Teeth
305/12	70/2.5	120/265	3
457/18	127/4.5	150/331	4
610/24	198/7.0	175/386	5
762/30	255/9.5	195/430	5
914/36	311/11.5	210/463	6

## Counterweights

Minimum Counterweight Recommendations

### Standard Stick

Loader Bucket	Power Train	kg	lb
GP	2WD	231	510
GP	4WD	116	255
MP	2WD/4WD	no counterweight	

### Extendible Stick

Loader Bucket	Power Train	kg	lb
GP	2WD/4WD	488	1,075
MP	2WD	231	510
MP	4WD	116	255

## Machine Dimensions

	Single-Tilt Loader		
	General Purpose (0.76 m <sup>3</sup> /1.0 yd <sup>3</sup> )	General Purpose (0.96 m <sup>3</sup> /1.25 yd <sup>3</sup> )	Multi Purpose (1.0 m <sup>3</sup> /1.3 yd <sup>3</sup> )
(1) Overall transport length	7233 mm/23 ft 9 in	7321 mm/24 ft 0 in	7285 mm/23 ft 11 in
Overall length (loader on ground)	7180 mm/23 ft 7 in	7293 mm/23 ft 11 in	7209 mm/23 ft 8 in
(2) Overall transport height (standard stick)	3577 mm/11 ft 9 in	3577 mm/11 ft 9 in	3577 mm/11 ft 9 in
Overall transport height (extendible stick)	3631 mm/11 ft 11 in	3631 mm/11 ft 11 in	3631 mm/11 ft 11 in
Overall width	2438 mm/8 ft 0 in	2438 mm/8 ft 0 in	2438 mm/8 ft 0 in
(3) Height to top of cab/canopy	2819 mm/9 ft 3 in	2819 mm/9 ft 3 in	2819 mm/9 ft 3 in
(4) Height to top of exhaust stack	2754 mm/9 ft 0 in	2754 mm/9 ft 0 in	2754 mm/9 ft 0 in
Height to loader hinge pin (transport)	365 mm/1 ft 2 in	365 mm/1 ft 2 in	417 mm/1 ft 4 in
Ground clearance (minimum)	320 mm/1 ft 1 in	320 mm/1 ft 1 in	320 mm/1 ft 1 in
(5) Rear axle centerline to front grill	2704 mm/8 ft 10 in	2704 mm/8 ft 10 in	2704 mm/8 ft 10 in
Front wheel tread gauge	1880 mm/6 ft 2 in	1880 mm/6 ft 2 in	1880 mm/6 ft 2 in
Rear wheel tread gauge	1727 mm/5 ft 8 in	1727 mm/5 ft 8 in	1727 mm/5 ft 8 in
(6) Wheelbase 2WD/4WD	2200 mm/7 ft 3 in	2200 mm/7 ft 3 in	2200 mm/7 ft 3 in

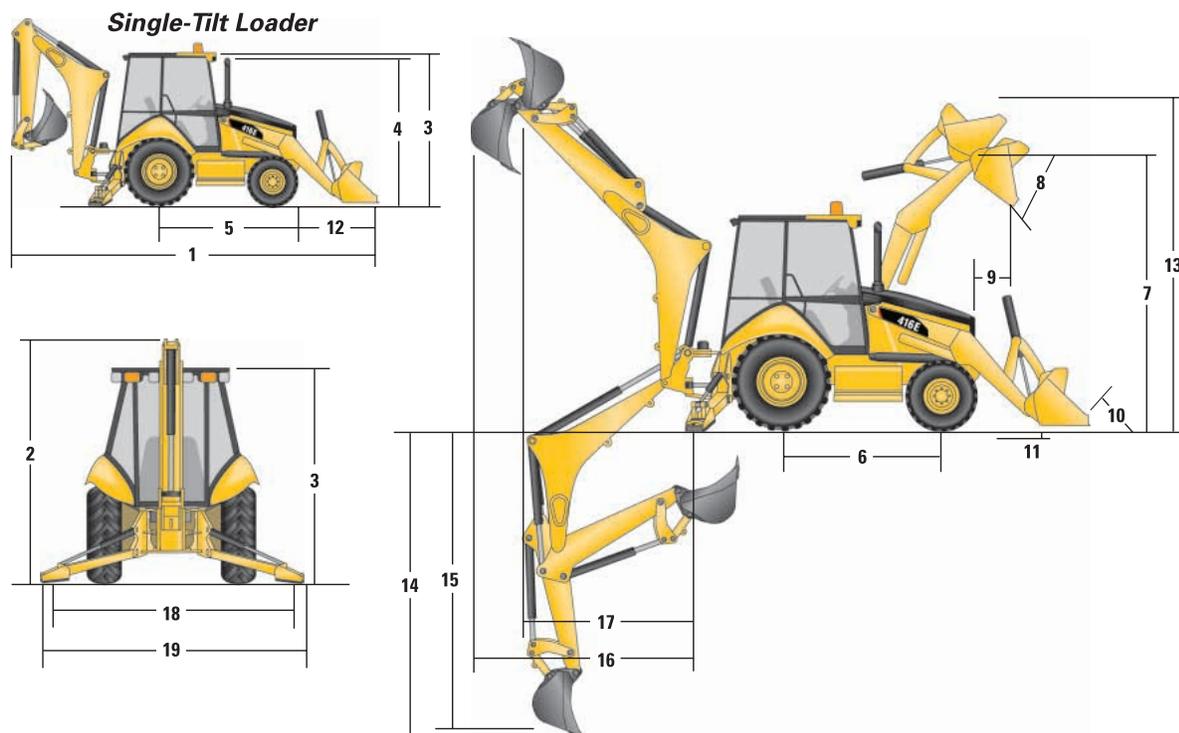
## Loader Bucket Dimensions and Performance

	Single-Tilt Loader		
	General Purpose (0.76 m <sup>3</sup> /1.0 yd <sup>3</sup> )	General Purpose (0.96 m <sup>3</sup> /1.25 yd <sup>3</sup> )	Multi Purpose (1.0 m <sup>3</sup> /1.3 yd <sup>3</sup> )
Capacity (SAE rated)	0.76 m <sup>3</sup> /1.0 yd <sup>3</sup>	0.96 m <sup>3</sup> /1.25 yd <sup>3</sup>	1.0 m <sup>3</sup> /1.3 yd <sup>3</sup>
Width	2262 mm/7 ft 5 in	2262 mm/7 ft 5 in	2262 mm/7 ft 5 in
Lift capacity at maximum height	2547 kg/5,615 lb	2427 kg/5,351 lb	2225 kg/4,905 lb
Breakout force	40.9 kN/9,185 lb	38.1 kN/8,565 lb	37.2 kN/8,363 lb
(7) Maximum hinge pin height	3296 mm/10 ft 10 in	3296 mm/10 ft 10 in	3296 mm/10 ft 10 in
(8) Dump angle at full height	44°	44°	44°
Dump height at maximum angle	2651 mm/8 ft 8 in	2573 mm/8 ft 5 in	2624 mm/8 ft 7 in
(9) Dump reach at maximum angle	772 mm/2 ft 6 in	853 mm/2 ft 10 in	761 mm/2 ft 6 in
(10) Maximum bucket rollback at ground level	39°	39°	40°
(11) Digging depth	106 mm/4 in	106 mm/4 in	133 mm/5 in
Maximum grading angle	110°	107°	110°
Width of dozer cutting edge	N/A	N/A	2262 mm/7 ft 5 in
(12) Grill to bucket cutting edge, carry position	1428 mm/4 ft 8 in	1516 mm/5 ft 0 in	1480 mm/4 ft 10 in
(13) Maximum operating height	4063 mm/13 ft 4 in	4196 mm/13 ft 9 in	4244 mm/13 ft 11 in
Jaw opening maximum	N/A	N/A	790 mm/2 ft 7 in
Bucket jaw clamping force	N/A	N/A	50.6 kN/11,385 lb
Weight (does not include teeth or forks)	340 kg/750 lb	438 kg/967 lb	723 kg/1,594 lb

# Backhoe Dimensions and Performance

	Standard Stick	Extendible Stick Retracted	Extendible Stick Extended
(14) Digging Depth, SAE max	4360 mm/14 ft 4 in	4402 mm/14 ft 5 in	5456 mm/17 ft 11 in
(15) Digging Depth, 2 ft flat bottom	4321 mm/14 ft 2 in	4363 mm/14 ft 4 in	5420 mm/17 ft 10 in
Reach from rear axle centerline at ground line	6721 mm/22 ft 1 in	6760 mm/22 ft 2 in	7769 mm/25 ft 6 in
(16) Reach from swing pivot at ground line	5618 mm/18 ft 5 in	5657 mm/18 ft 7 in	6666 mm/21 ft 10 in
Maximum operating height	5523 mm/18 ft 1 in	5555 mm/18 ft 3 in	6302 mm/20 ft 8 in
Loading height	3636 mm/11 ft 11 in	3577 mm/11 ft 9 in	4145 mm/13 ft 7 in
(17) Loading reach	1768 mm/5 ft 10 in	1868 mm/6 ft 2 in	2771 mm/9 ft 1 in
Swing arc	180°	180°	180°
Bucket rotation	205°	205°	205°
(18) Stabilizer spread, operating position (center)	3310 mm/10 ft 10 in	3310 mm/10 ft 10 in	3310 mm/10 ft 10 in
(19) Stabilizer spread, operating position (outside)	3770 mm/12 ft 4 in	3770 mm/12 ft 4 in	3770 mm/12 ft 4 in
Stabilizer spread, transport position	2322 mm/7 ft 7 in	2322 mm/7 ft 7 in	2322 mm/7 ft 7 in
Bucket dig force	51.8 kN/11,655 lb	51.1 kN/11,491 lb	51.1 kN/11,491 lb
Stick dig force	31.8 kN/7,151 lb	31.8 kN/7,151 lb	23.4 kN/5,250 lb

Dimensions and performance specifications shown are for machines equipped with 12.5/80-18 SGL front tires, 19.5L-24 IT525 rear tires, ROPS canopy, standard stick with 24-inch standard-duty bucket, and 1.0 yd<sup>3</sup> loader bucket and standard equipment unless otherwise specified.

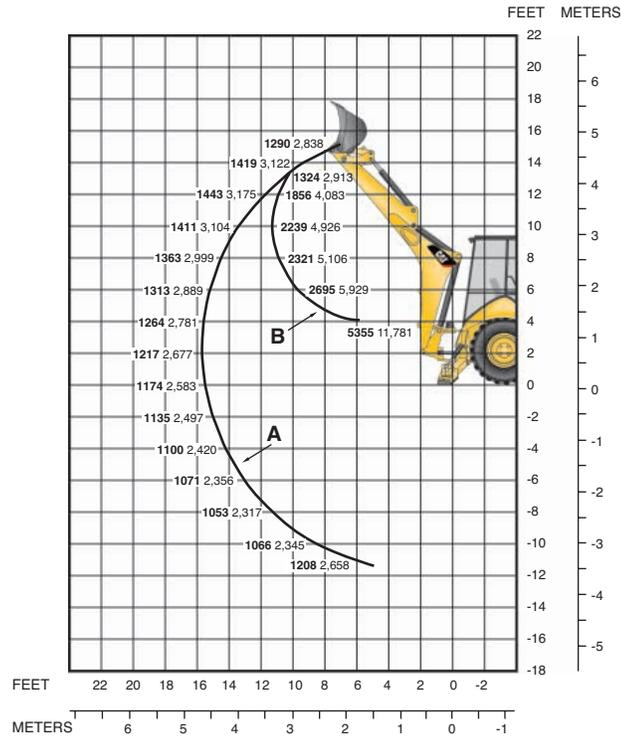


# Backhoe Lift Capacity

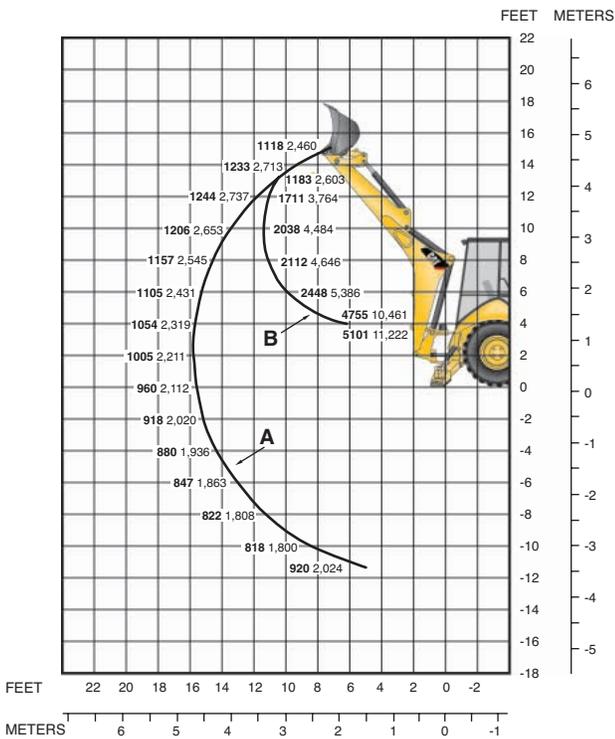
## Cat 416E Standard Stick

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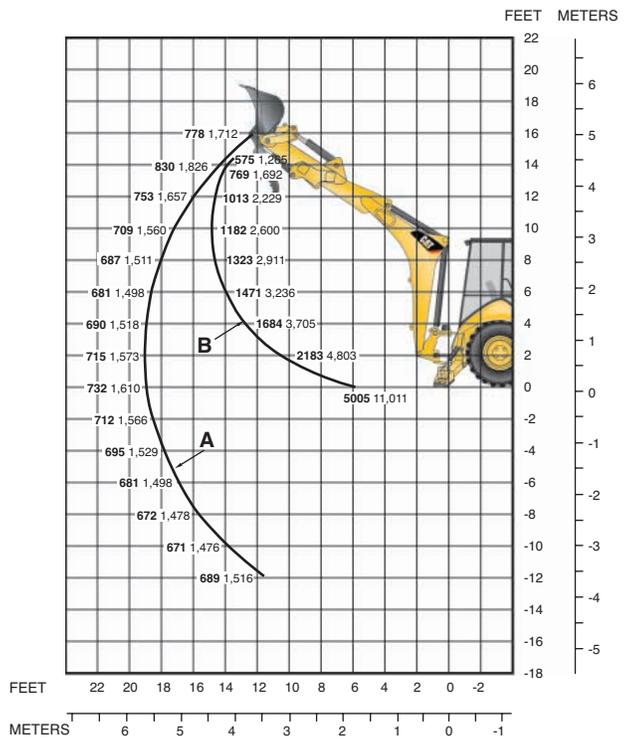
- A — Boom lift kg lb
- B — Stick lift kg lb



## Cat 416E Extendible Stick — Retracted



## Cat 416E Extendible Stick — Extended



Lift capacities are over-end values. Machine equipped with 4WD, OROPS, 0.76 m<sup>3</sup> (1.0 yd<sup>3</sup>) general purpose bucket, and 116 kg (255 lb) counterweight. Extendible stick includes 488 kg (1,075 lb) counterweight.

## Standard Equipment

*Standard equipment may vary. Consult your Caterpillar dealer for details.*

Air cleaner	Indicators
Alarm, back-up	Air cleaner service, water separator service, brake on, engine coolant, hydraulic oil level sight gauge, oil pressure
Backhoe position foot rests	Instrument panel lights
Battery, maintenance-free, 880 CCA	Key start/stop system
Boom transport lock	Lights, working (2 front, 2 rear)
Brace, lift cylinder	Loader, self-leveling, return-to-dig and transmission disconnect switch
Brake, secondary parking	Lunch box holder
Brakes, oil disc, dual pedals, interlocking	Mirror, rear view
Bucket level indicator	Power receptacle, 12V, internal and external
Canopy, ROPS/FOPS	Power steering, hydrostatic
Coat hook	Rubber impact strips on radiator guard
Coolant/Antifreeze, extended life	Seat belt, retractable (51 mm/2 in)
Counterweight, bumper	Service harness
Differential lock	Stabilizer shoes, grouser type
Dome light (cab only)	Seat, air suspension with armrest
Engine, Cat 3054C DINA (Direct Injection Naturally Aspirated)	Stabilizer controls, cable operated
Engine enclosure	Starting system, glow plugs
Face seals, O-ring	Stop and tail lights
Fan, suction and guard	Swing transport lock
Fast reversing shuttle, all gears	Tires, see page 17
Fenders, rear	Toolbox, external, lockable
Filters, spin-on: fuel, engine oil, transmission oil, water separator, hydraulic fluid	Torque converter
Flashing hazard/signal lights	Throttles, hand and foot
Floor mat	Transmission, four speed, synchromesh
Gauges	Transmission neutralizer switch
Coolant temperature, fuel level, tachometer, hour meter, torque converter oil temperature	Transport tie-downs
Ground level fuel fill	Warning horn, electric
Hydraulic hose, XT <sup>TM</sup> -3 ES	
Hydraulic oil cooler	

## Optional Equipment (with approximate change in operating weight)

*Optional equipment may vary. Consult your Caterpillar dealer for specifics.*

	kg	lb		kg	lb
AccuGrade® Site Reference System for Backhoe Loaders	19	42	Cutting edge, bolt-on, two piece	70	154
AccuGrade Laser Reference System for Backhoe Loaders	48	105	Fenders, 4WD, front	12	26
Attachments, backhoe			Fenders, rear extensions	1	2
Mechanical Quick Coupler			Guards		
D and E-Series buckets	75	165	Stabilizer, rock	31	68
C-Series buckets	75	165	High ambient cooling package	2	4
D, E and Deere buckets	75	165	Hydraulic valves, loader (3rd valve for MP)	27	59
D, E and Case buckets	80	176	Hydraulic valves, backhoe		
Hydraulic thumb	139-157	306-345	5th Function	5	11
Attachments, front loader (single tilt)			6th Function	5	11
General purpose buckets			Hydraulic lines		
0.76 m <sup>3</sup> (1.0 yd <sup>3</sup> )	385	847	Combo, Standard Stick	27	59
0.96 m <sup>3</sup> (1.25 yd <sup>3</sup> )	452	994	Combo, E-Stick	27	59
Multi purpose bucket			One-way, E-Stick	22	48
1.0 m <sup>3</sup> (1.3 yd <sup>3</sup> )	714	1,571	Lights: Working, additional (2 front, 2 rear)	0	0
1.0 m <sup>3</sup> (1.3 yd <sup>3</sup> ) with forks	884	1,945	Product Link	4	9
Axle, front			Ride control	22	48
Four wheel drive with driveshaft guard	155	341	Rotating beacon		
Backhoe controls			Magnetic mount	5	11
Excavator pattern	0	0	Stabilizers, available with guards		
Battery, additional, 880 CCA	25	55	Street	37	81
Cab, utility	210	462	Reversible	38	84
Cab, utility plus	220	484	Sticks		
Cab, utility plus with air conditioning	258	568	Extendible	299	658
Canopy Plus, ROPS	15	33	Teeth, loader bucket	45	99
Cat 3054 DIT (Direct Injection Turbo) Engine	5	11	Vandalism protection		
Coolant, additional protection, -50° C (-58° F)	0	0	Gauge cover	1	2
Counterweights			Padlocks	1	2
255 lb	116	255	Hood lock	0	0
510 lb	231	510			
1,075 lb	488	1,075			

# 416E Backhoe Loader

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AEHQ5684-02 (11-07)  
Replaces AEHQ5684-01

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